Exhibit NSTAR Gas-PRM-1

THE COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

IN THE MATTER OF THE REVISION OF RATES

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NSTAR GAS COMPANY

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Direct Testimony

of

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Concerning
Cost of Equity

NSTAR Gas Company
Direct Testimony of Paul R. Moul
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GLOSSARY OF ACRONYMS AND DEFINED TERMS	
ACRONYM	**DEFINED TERM**
AFUDC	Allowance for Funds Used During Construction
β	Beta
b	Represents the retention rate that consists of the fraction of earnings that are not paid out as dividends
b x r	Represents internal growth
CAPM	Capital Asset Pricing Model
CCR	Corporate Credit Rating
CE	Comparable Earnings
DCF	Discounted Cash Flow
D.T.E.	Department of Telecommunications and Energy
EPACT	National Energy Policy Act
FERC	Federal Energy Regulatory Commission
FOMC	Federal Open Market Committee
g	Growth rate
GAAP	Generally accepted accounting principles
GCR	Gas Cost Recovery mechanism
GDP	Gross Domestic Product
LDC	local distribution companies
IGF	Internally Generated Funds
Lev	Leverage modification
LT	Long Term
MM	Modigliani & Miller
MLP	Master Limited Partnerships
PBR	Performance-Based Rate
PUC	Public Utility Commission
r	represents the expected rate of return on common equity
Rf	Risk-free rate of return
Rm	Market risk premium
RP	Risk Premium

GLOSSARY OF ACRONYMS AND DEFINED TERMS	
ACRONYM	**DEFINED TERM**
s	Represents the new common shares expected to be issued by a firm
s x v	Represents external growth
S&P	Standard & Poor's
v	Represents the value that accrues to existing shareholders from selling stock at a price different from book value

INTRODUCTION AND SUMMARY OF RECOMMENDATIONS

Q. Please state your name, occupation and business address.

A. My name is Paul Ronald Moul. My business address is 251 Hopkins Road, Haddonfield, New Jersey 08033-3062. I am Managing Consultant of the firm P. Moul & Associates, an independent financial and regulatory consulting firm. My educational background, business experience and qualifications are provided in Appendix A, which follows my direct testimony.

Q. What is the purpose of your testimony?

A. My testimony presents evidence, analysis and a recommendation concerning the appropriate rate of return on common equity that the Department of Telecommunications and Energy (the "Department") should allow NSTAR Gas Company ("NSTAR Gas") an opportunity to earn on its jurisdictional rate base. My analysis and recommendation are supported by the detailed financial data contained in Exhibit NSTAR Gas-PRM-2, which is a multi-page document divided into eleven (11) schedules. Additional evidence, in the form of appendices, follows my direct testimony. The items covered in these appendices provide additional detailed information concerning the explanation and application of the various financial models upon which I rely.

Q. Based upon your analysis, what is your conclusion concerning the appropriate rate of return and cost of common equity for NSTAR Gas?

A. My conclusion is that NSTAR Gas' cost of common equity is 11.50% and that the

Department should adopt this cost for purposes of establishing a reasonable rate of return. As shown on Schedule 1, I have presented the weighted average cost of capital, which is 9.75% for NSTAR Gas. The resulting overall cost of capital, which is the product of weighting the individual capital costs by the proportion of each respective type of capital, should, if adopted by the Department, establish a compensatory level of return for the use of capital and provide NSTAR Gas with the ability to attract capital on reasonable terms.

Q. What background information have you considered in reaching a conclusion concerning NSTAR Gas' cost of capital?

A. NSTAR Gas provides natural gas service to approximately 253,000 sales and transportation customers in communities in central and southeastern Massachusetts, as well as the City of Cambridge. NSTAR Gas' gas throughout consists of approximately 45% to residential, 37% to commercial, 12% to industrial, and 5% to public authorities customers. NSTAR Gas obtains its natural gas supply from various producers and marketers and has delivery arrangements with interstate pipeline companies. NSTAR Gas supplements flowing natural gas with liquefied natural gas and liquid propane.

NSTAR Gas is a wholly-owned subsidiary of NSTAR. NSTAR was created on August 25, 1999 with the combination of BEC Energy and Commonwealth Energy System. In addition to NSTAR Gas, NSTAR has three other public utilities that provide electric service to over one million customers in

the Boston metropolitan area and throughout eastern Massachusetts, including Cape Cod and Martha's Vineyard.

Q. How have you determined the cost of common equity in this case?

A. The cost of common equity is established using capital market and financial data relied upon by investors to assess the relative risk, and hence the cost of equity, for a natural gas utility, such as NSTAR Gas. In this regard, I relied on four well-recognized measures of the cost of equity: the Discounted Cash Flow ("DCF") model, the Risk Premium ("RP") analysis, the Capital Asset Pricing Model ("CAPM"), and the Comparable Earnings ("CE") approach. By considering the results of a variety of approaches, I determined that an 11.50% cost of common equity is reasonable for NSTAR Gas.

Q. In your opinion, what factors should the Department consider when determining NSTAR Gas' cost of capital in this proceeding?

A. The Department should consider the ratesetting principles that I have set forth in Appendix B. The end result of the Department's rate of return allowance must provide a utility with the opportunity to cover its interest and dividend payments, provide a reasonable level of earnings retention, produce an adequate level of internally generated funds to meet capital requirements, be adequate to attract capital in all market conditions, be commensurate with the risk to which the utility's capital is exposed, and support reasonable credit quality.

Q. What factors have you considered in measuring the cost of equity in this

case?

A. The models that I used to measure the cost of common equity for NSTAR Gas were applied with market and financial data developed from my proxy group of five natural gas companies. The proxy group consists of natural gas companies that are included in The Value Line Investment Survey. They have operations in the Northeastern and Southeastern regions of the U.S., their stock is traded on the New York Stock Exchange, they have not cut or omitted their dividend since 2000, and they are not currently the target of a merger, acquisition, or self-induced sale. The companies in the gas proxy group are identified on page 2 of Schedule 3. I will refer to these companies as the "Gas Group" throughout my testimony.

Q. How have you performed your cost of equity analysis with the market data for the Gas Group?

A. I have applied the models/methods for estimating the cost of equity using the average data for the Gas Group. I have not separately measured the cost of equity for the individual companies within the Gas Group, because the determination of the cost of equity for an individual company has become increasingly problematic. By employing group average data, rather than individual company analysis, I have helped to minimize the effect of extraneous influences on the market data for an individual company.

Q. Please summarize your cost of equity analysis.

A. My cost of equity determination was derived from the results of the methods/models identified above. In general, the use of more than one method provides a superior foundation to arrive at the cost of equity. At any point in time, reliance on a single method can provide an incomplete measure of the cost of equity depending upon extraneous factors that may influence market sentiment. The specific application of these methods/models will be described later in my testimony. The following table provides a summary of the indicated costs of equity using each of these approaches.

	Gas Group
DCF	10.12%
RP	11.50%
CAPM	12.53%
CE	13.65%

The mean and median of all methods is 11.95% and 12.02%, respectively. Focusing upon the market models of the cost of equity (i.e., DCF, Risk Premium and CAPM), the equity return averages to 11.38% (10.12% + 11.50% + 12.53% = 34.15% ÷ 3). The Department has previously recognized the usefulness of the DCF and Risk Premium measures when considering the cost of equity. At this time, however, the DCF model is providing atypical results. That is to say, it is the only model that shows a result less than 11%, and indeed is barely providing a double digit (i.e., above 10%) return. The low DCF returns can be traced in part

to the unfavorable investor sentiment for the gas companies. Indeed, the average Value Line Timeliness Rank for my Gas Group is "4," which places them in the below average category and signifies that they are relatively unattractive investments. Moreover, page 5 of Schedule 10 shows that the natural gas distribution companies are ranked 97 out of 98 industries for probable performance over the next twelve months. Although the Department's past evaluation of, and reliance on, the DCF and Risk Premium has guided its determination of the cost of equity capital, I am recommending less reliance on DCF in this case. Because I expect that NSTAR Gas will be subject to some form of a PBR formula over at least the next five years, I am recommending an 11.50% rate of return on common equity. That is not to say that I have ignored the DCF results, but rather I believe that my 11.50% recommendation is an appropriate estimate of NSTAR Gas' cost of common equity for the applicable period and is below the lower end of the range of cost estimates produced by the other three methods (i.e., 11.50%, 12.53% and 13.65%) employed in my analysis. I also believe the 11.50% cost of equity recommendation is appropriate because it makes no provision for the prospect that the rate of return may not be achieved due to unforeseen events that could occur during the effective period of the PBR plan. Therefore, a return on common equity of 11.50% is appropriate and reasonable in this case.

Q. You referenced a PBR plan in your prior answer. Has NSTAR Gas included

a PBR proposal as a component of its request for a base rate increase?

A. It is my understanding that NSTAR Gas has not submitted a formal PBR proposal at this time. However, it is also my understanding that shortly after the Department's ratesetting determination at the conclusion of this proceeding, NSTAR Gas expects to submit a PBR plan similar in scope and duration to other PBR formulas previously adopted by the Department. Thus, like other utilities that have recently had their base rates reviewed by the Department, NSTAR Gas will have a PBR formula applied to its "cast-off"" rates for at least a five-year duration.

NATURAL GAS RISK FACTORS

Q. What factors currently affect the business risk of the natural gas utilities?

A. The new competitive, regulatory and economic risks facing gas utilities are different today than formerly. Market-oriented pricing, open access for gas transportation, and changes in service agreements mean that natural gas utilities have been operating in a more complex environment with time frames for decision-making considerably shortened. Of particular concern for NSTAR Gas, the recent high prices and volatility in commodity prices has had a negative impact on its customers. Higher commodity prices mean higher customer bills, as the cost of delivered gas is recovered through the gas cost recovery mechanism ("GCR"). Higher and volatile gas costs may result in further declines in average use per existing customer and in fewer new customers selecting natural gas to

meet their energy needs. The resulting high gas prices have also had an impact on the number of delinquent customer accounts.

The unbundling of rates and full customer choice exemplifies the changes taking place for gas utilities in Massachusetts. As the competitiveness of the natural gas business increases, the risk also increases. With the availability of customer-owned transportation gas, along with delivery of uncertain volumes to dual-fuel customers, risk will continue to rise as large end users obtain for themselves the range of unbundled service offerings which are currently available from the interstate pipelines for the local distribution utilities.

Aside from these factors, some regulators have intensified their scrutiny of service quality standards and may now hold distribution companies responsible financially for meeting increasingly stringent operational standards. These programs can result in financial penalties being imposed on distribution companies if they are unable to meet high standards of performance, which can be perceived by investors as an additional source of risk.

Q. Does NSTAR Gas face competition in its natural gas business?

A. Yes. Natural gas continues to face significant competition from alternative energy sources. Indeed, major customers of NSTAR Gas maintain alternative fuel capability. In addition to being subject to "gas on gas" competition, NSTAR Gas faces direct competition from fuel oil in its service territory. Fuel oil dealers

are strong competitors in NSTAR Gas' market area, because they are not inhibited by regulatory constraints when conducting their marketing activities.

In addition, the changes fostered by the Federal Energy Regulatory Commission's Order 636 have promoted competition among and between pipelines and distributors through bypass facilities and placed more responsibilities on local distribution companies, such as NSTAR Gas, to manage the upstream acquisition and delivery functions both from a reliability and price perspective. Bypass represents a threat to local distribution companies ("LDC"), especially when electric generation customers are in close proximity to the interstate pipelines. Bypass has not yet occurred in NSTAR Gas' service area, but the threat of bypass is a real risk for NSTAR Gas. NSTAR Gas has been proactive to the threat of bypass by working with its customers that are in close proximity to interstate pipelines. The major problem is that the larger customers have made their own gas supply arrangements and the customers that remain sales customers tend to be lower load factor customers that tend to be more expensive to serve.

Q. How does NSTAR Gas' throughput to transportation, interruptible, and electric generation customers affect its risk profile?

A. NSTAR Gas' risk profile is influenced by natural gas sold/delivered to transportation, interruptible, and electric generation customers. The threat of bypass is a common characteristic of large volume users. Success in this aspect

of NSTAR Gas' market is subject to the business cycle, the price of alternative energy sources, and pressures from the competitors. Moreover, external factors can also influence NSTAR Gas' throughput to these customers which face competitive pressure on their operations from facilities located outside NSTAR Gas' service territory.

Q. Are there other specific features of NSTAR Gas' business that should be considered when assessing NSTAR Gas' risk?

A. Yes. Many of NSTAR Gas' residential customers use natural gas for space heating purposes. This indicates that a large proportion of NSTAR Gas' residential customers present a low load factor profile and that their energy demands are significantly influenced by temperature conditions, over which NSTAR Gas has absolutely no control. For these sales, NSTAR Gas' revenues are subject to variations caused by weather abnormalities.

Q. Please indicate how its construction program affects NSTAR Gas' risk profile.

A. NSTAR Gas is faced with the requirement to undertake a major investment to maintain and upgrade existing facilities in its service territory. To maintain safe and reliable service to existing customers, NSTAR Gas must invest to upgrade its infrastructure, especially to replace its cast iron and unprotected steel mains. The rehabilitation of NSTAR Gas' infrastructure represents a non-revenue producing use of capital. NSTAR Gas had 1,327 miles (or 44%) of its distribution mains

constructed of cast iron and unprotected steel pipe as of year-end 2004. Also, NSTAR Gas has 53,892 (or 30%) of its services constructed of galvanized and unprotected steel pipe.

Over the next five years, NSTAR Gas' total capital expenditures are expected to be approximately $163 million. These expenditures will represent an approximate 41% ($163 million ÷ $400.509 million) increase in net utility plant from the level at December 31, 2004. As noted previously, a fair rate of return for NSTAR Gas represents a key to a financial profile that will provide NSTAR Gas with the ability to raise the capital necessary to meet its capital needs on an ongoing basis and provide a fair return to existing and future investors.

Q. How should the Department respond to the issues facing the natural gas utilities and in particular NSTAR Gas?

A. The Department should recognize and take into account the heightened competitive environment in the natural gas business in determining the cost of capital for NSTAR Gas and provide a reasonable opportunity for NSTAR Gas to actually achieve its cost of capital.

FUNDAMENTAL RISK ANALYSIS

Q. Is it necessary to conduct a fundamental risk analysis to provide a framework for a determination of a utility's cost of equity?

A. Yes. It is necessary to establish a company's relative risk position within its industry through a fundamental analysis of various quantitative and qualitative

factors that bear upon investors' assessment of overall risk. The qualitative factors that bear upon NSTAR Gas' risk have already been discussed. The quantitative risk analysis follows. The items that influence investors' evaluation of risk and their required returns are described in Appendix C. For this purpose, I compared NSTAR Gas to the S&P Public Utilities, an industry-wide proxy consisting of various regulated businesses, and to the Gas Group.

Q. What are the components of the S&P Public Utilities?

A. The S&P Public Utilities is a widely recognized index that consists of electric power and natural gas companies. These companies are identified on page 3 of Schedule 4.

Q. What criteria did you employ to assemble the Gas Group?

A. The Gas Group that I employed in this case includes companies that (i) are engaged in similar business lines, (ii) have publicly-traded common stock that is listed on the New York Stock Exchange, (iii) are contained in The Value Line Investment Survey in the industry group entitled "Natural Gas Distribution," (iv) have operations in the Northeastern and Southeastern regions of the U.S., (v) have not cut or omitted their dividend since 2000, (vi), are not currently the target of a merger or acquisition. and (vii) have at least 70% of their assets represented by gas operations.

Q. Why have you imposed a selection criterion that includes a percentage of gas assets?

A. In order to associate the cost of equity to the gas business, I have employed

screening criteria that impose a limitation on the non-gas businesses of the proxy companies. In this regard, there are three principal financial variables that could be employed to measure the role of non-gas business of a firm. These are: revenues, operating income, and assets employed. I imposed a screening criterion whereby 70% of a company's assets must be devoted to the gas business for them to be included in the Gas Group.

I did not use revenues for this purpose because the margins on other business segments are generally dissimilar to the gas distribution business. Energy trading is a case in point, which would make revenue comparisons incompatible for this purpose.

I also did not use operating income for this purpose because of the margin issue discussed above. In addition, some non-regulated business segments may incur losses due to start-up, or other reasons, that can distort the percentage calculations.

I did use an asset screening criteria because it best describes the amount of capital that a firm devotes to each business segment. It is the potential return on that capital that represents the primary focus of investors when they value the securities of a firm.

The Gas Group has the following percentage of its operations from the gas utility business: revenues 65%, income 82%, and identifiable assets 86%. These determinations were made to the extent that information was revealed in each company's 2004 annual report. Therefore, this Gas Group provides a close match to

the characteristics of a gas utility, such as NSTAR Gas.

Q. Is knowledge of a utility's bond rating an important factor in assessing its risk and cost of capital?

A. Yes. Knowledge of a company's credit quality rating is important because the cost of each type of capital is directly related to the associated risk of the firm. So while a company's credit quality risk is shown directly by the rating and yield on its bonds, these relative risk assessments also bear upon the cost of equity. This is because a firm's cost of equity is represented by its borrowing cost plus compensation to recognize the higher risk of an equity investment compared to debt.

Q. How do the bond ratings compare for NSTAR Gas, the Gas Group, and the S&P Public Utilities?

A. Presently, the corporate credit rating ("CCR") for NSTAR Gas is A from Standard and Poor's Corporation ("S&P") and the Long Term ("LT") issuer rating is A2 from Moody's Investors Service ("Moody's"). The CCR designation by S&P and LT issuer rating by Moody's focuses upon the credit quality of the issuer of the debt, rather than upon the debt obligation itself. The average ratings of the Gas Group are A2 from S&P and A2 from Moody's. These ratings are similar to NSTAR Gas. For the S&P Public Utilities, the average composite rating is BBB by S&P and Baa2 by Moody's. Many of the financial indicators that I will subsequently discuss are considered during the rating process.

Q. How do the financial data compare for NSTAR Gas, the Gas Group, and the S&P Public Utilities?

A. The broad categories of financial data that I will discuss are shown on Schedules 2, 3, and 4. The data cover the five-year period 2000-2004. The important categories of relative risk may be summarized as follows:

Size. In terms of capitalization, NSTAR Gas is smaller than the average size of the Gas Group. The average size of the S&P Public Utilities is larger than NSTAR Gas and the Gas Group. All other things being equal, a smaller company is riskier than a larger company because a given change in revenue and expense has a proportionately greater impact on a small firm. As I will demonstrate later, the size of a firm can impact its cost of equity. This is the case for NSTAR Gas and the Gas Group.

Market Ratios. Market-based financial ratios provide a partial indication of the investor-required cost of equity. If all other factors are equal, investors will require a higher rate of return on equity for companies that exhibit greater risk, in order to compensate for that risk. That is to say, a firm that investors perceive to have higher risks will experience a lower price per share in relation to expected earnings.

There are no market ratios available for NSTAR Gas because NSTAR Gas owns its stock. The five-year average price-earnings multiple for the Gas Group was fairly similar to that of the S&P Public Utilities. Also, the five-year average

dividend yields were fairly similar for the Gas Group and the S&P Public Utilities. The average market-to-book ratio was somewhat higher for the Gas Group than the S&P Public Utilities.

Common Equity Ratio. The level of financial risk is measured by the proportion of long-term debt and other senior capital that is contained in a company's capitalization. Financial risk is also analyzed by comparing common equity ratios (the complement of the ratio of debt and other senior capital). That is to say, a firm with a high common equity ratio has lower financial risk, while a firm with a low common equity ratio has higher financial risk. The five-year average common equity ratios, based on permanent capital, were 79.6% for NSTAR Gas, 50.5% for the Gas Group, and 37.9% for the S&P Public Utilities.

Return on Book Equity. Greater variability (i.e., uncertainty) of a firm's earned returns signifies relatively greater levels of risk, as shown by the coefficient of variation (standard deviation ÷ mean) of the rate of return on book common equity. The higher the coefficients of variation, the greater degree of variability. For the five-year period, the coefficients of variation were 0.236 (1.7% ÷ 7.2%) for NSTAR Gas, 0.076 (1.0% ÷ 13.1%) for the Gas Group, and 0.283 (2.8% ÷ 9.9%) for the S&P Public Utilities.

Operating Ratios. I have also compared operating ratios (the percentage of revenues consumed by operating expense, depreciation and taxes other than income). The five-year average operating ratios were 88.0% for NSTAR Gas,

86.6% for the Gas Group, and 84.8% for the S&P Public Utilities. NSTAR Gas had the highest operating ratios among the groups.

Coverage. The level of fixed charge coverage (i.e., the multiple by which available earnings cover fixed charges, such as interest expense) provides an indication of the earnings protection for creditors. Higher levels of coverage, and hence earnings protection for fixed charges, are usually associated with superior grades of creditworthiness. The five-year average interest coverage (excluding Allowance for Funds Used During Construction ("AFUDC")) was 4.95 times for NSTAR Gas, 4.24 times for the Gas Group, and 2.56 times for the S&P Public Utilities.

Quality of Earnings. Measures of earnings quality usually are revealed by the percentage of AFUDC related to income available for common equity, the effective income tax rate, and other cost deferrals. These measures of earnings quality usually influence a firm's internally generated funds because poor quality of earnings would not generate high levels of cash flow. Quality of earnings has not been a significant concern for NSTAR Gas, the Gas Group, and the S&P Public Utilities.

Internally Generated Funds. Internally generated funds ("IGF") provide an important source of new investment capital for a utility and represent a key measure of credit strength. Historically, the five-year average percentage of IGF to capital expenditures was 108.2% for NSTAR Gas 96.8% for the Gas Group,

and 107.1% for the S&P Public Utilities.

Betas. The financial data that I have been discussing relate primarily to company-specific risks. Market risk for firms with publicly-traded stock is measured by beta coefficients. Beta coefficients attempt to identify systematic risk, i.e., the risk associated with changes in the overall market for common equities. Value Line publishes such a statistical measure of a stock's relative historical volatility to the rest of the market. A comparison of market risk is shown by the Value Line beta of .74 as the average for the Gas Group (see page 2 of Schedule 3), and .95 as the average for the S&P Public Utilities (see page 3 of Schedule 4). Keeping in mind that the utility industry has changed dramatically during the past five years, the systematic risk percentage is 78% (.74 ÷ .95) for the Gas Group, using the S&P Public Utilities' average beta as a benchmark.

Q. Please summarize your risk evaluation of NSTAR Gas and the Gas Group.

A. The risk of NSTAR Gas parallels that of the Gas Group in certain respects. As such, the cost of equity for the Gas Group would provide a reasonable basis for measuring NSTAR Gas' cost of equity.

COST OF EQUITY – GENERAL APPROACH

Q. Please describe the process you employed to determine the cost of equity for NSTAR Gas.

A. Although my fundamental financial analysis provides the required framework to establish the risk relationships among NSTAR Gas, the Gas Group, and the S&P

Public Utilities, the cost of equity must be measured by standard financial models that I describe in Appendix D. Differences in risk traits, such as size, business diversification, geographical diversity, regulatory policy, financial leverage, and bond ratings must be considered when analyzing the cost of equity.

It is also important to reiterate that no one method or model of the cost of equity can be applied in an isolated manner. Rather, informed judgment must be used to take into consideration the relative risk traits of the firm. It is for this reason that I have used more than one method to measure NSTAR Gas' cost of equity. As noted in Appendix D, and elsewhere in my direct testimony, each of the methods used to measure the cost of equity contains certain incomplete and/or overly restrictive assumptions and constraints that are not optimal. Therefore, I favor considering the results from a variety of methods. In this regard, I applied each of the methods with data taken from the Gas Group and have arrived at a cost of equity of 11.50% for NSTAR Gas.

DISCOUNTED CASH FLOW ANALYSIS

Q. Please describe your use of the Discounted Cash Flow approach to determine the cost of equity.

A. The details of my use of the DCF approach and the calculations and evidence in support of my conclusions are set forth in Appendix E. I will summarize them here. The DCF model seeks to explain the value of an asset as the present value of future expected cash flows discounted at the appropriate risk-adjusted rate of

return. In its simplest form, the DCF return on common stocks consists of a current cash (dividend) yield and future price appreciation (growth) of the investment. The cost of equity based on a combination of these two components represents the total return that investors can expect with regard to an equity investment.

Among other limitations of the model, there is a certain element of circularity in the DCF method when applied in rate cases. This is because investors' expectations for the future depend upon regulatory decisions. In turn, when regulators depend upon the DCF model to set the cost of equity, they rely upon investor expectations that include an assessment of how regulators will decide rate cases. Due to this circularity, the DCF model may not fully reflect the true risk of a utility.

As I describe in Appendix E, the DCF approach has other limitations that diminish its usefulness in the ratesetting process when the market capitalization diverge significantly from book value capitalization. When this situation exists, the DCF method will lead to a misspecified cost of equity when it is applied to a book value capital structure.

If regulators rely upon the results of the DCF (which are based on the market price of the stock of the companies analyzed) and apply those results to book value, the resulting earnings will not produce the level of required return specified by the model when market prices vary from book value. This is to say,

such distortions tend to produce DCF results that understate the cost of equity to the regulated firm when using book values. This shortcoming of the DCF has persuaded one regulatory agency to adjust the cost of equity upward to make the return consistent with the book value capital structure. The Pennsylvania Public Utility Commission in its Order entered December 22, 2004 involving PPL Electric Utilities Corporation at Docket No. R-00049255 acknowledged that an adjustment to the DCF results was required to make the return consistent with the book value capital structure. In that decision, the Pennsylvania PUC provided PPL (a wires-only electric delivery utility) with an additional 45 basis points to the simple DCF derived cost of equity for the financial risk difference related to the divergence of the market capitalization from the book value capitalization. Similar provisions were made by the Pennsylvania PUC in its decisions dated January 10, 2002 for Pennsylvania-American Water Company at Docket No. R-00016339, dated August 1, 2002 for Philadelphia Suburban Water Company in Docket No. R-00016750, dated January 29, 2004 for Pennsylvania American Water Company at Docket No. R-00038304 (affirmed by the Commonwealth Court on November 8, 2004), and dated August 5, 2004 for Aqua Pennsylvania, Inc. at Docket No. R-00038805. It must be recognized that in order to make the DCF results relevant to the capitalization measured at book value (as is done for rate setting purposes), the market-derived cost rate cannot be used without modification. As I will explain later in my testimony, the DCF model can be

modified to account for differences in risk attributed to changes in financial leverage when market prices and book values diverge.

Q. Please explain the dividend yield component of a DCF analysis.

A. The DCF methodology requires the use of an expected dividend yield to establish the investor-required cost of equity. For the twelve months ended June 2005, the monthly dividend yields of the Gas Group are shown graphically on Schedule 5. The monthly dividend yields shown on Schedule 5 reflect an adjustment to the month-end prices to reflect the build up of the dividend in the price that has occurred since the last ex-dividend date (i.e., the date by which a shareholder must own the shares to be entitled to the dividend payment – usually about two to three weeks prior to the actual payment). An explanation of this adjustment is provided in Appendix E.

For the twelve months ending June 2005, the average dividend yield was 3.66% for the Gas Group based upon a calculation using annualized dividend payments and adjusted month-end stock prices. The dividend yields for the more recent six- and three-month periods were 3.55% and 3.50%, respectively, for the Gas Group. I have used, for the purpose of my direct testimony, a dividend yield of 3.55% for the Gas Group, which represents the six-month average yield. The use of this dividend yield will reflect current capital costs while avoiding spot yields.

For the purpose of a DCF calculation, the average dividend yields must be

adjusted to reflect the prospective nature of the dividend payments i.e., the higher expected dividends for the future. Recall that the DCF is an expectational model that must reflect investor anticipated cash flows for the Gas Group. I have adjusted the six-month average dividend yield in three different but generally accepted manners, and used the average of the three adjusted values as calculated in Appendix E. That adjusted dividend yield is 3.66% for the Gas Group.

Q. Please explain the underlying factors that influence investor's growth expectations.

A. As noted previously, investors are interested principally in the future growth of their investment (i.e., the price per share of the stock). As I explain in Appendix E, future earnings per share growth represents their primary focus because under the constant price-earnings multiple assumption of the DCF model, the price per share of stock will grow at the same rate as earnings per share. In conducting a growth rate analysis, a wide variety of variables can be considered when reaching a consensus of prospective growth. The variables that can be considered include: earnings, dividends, book value, and cash flow stated on a per share basis. Historical values for these variables can be considered, as well as analysts' forecasts that are widely available to investors. A fundamental growth rate analysis can also be formulated, which consists of internal growth ("b x r"), where "r" represents the expected rate of return on common equity and "b" is the retention rate that consists of the fraction of earnings that are not paid out as

dividends. The internal growth rate can be modified to account for sales of new common stock -- this is called external growth ("s x v"), where "s" represents the new common shares expected to be issued by a firm and "v" represents the value that accrues to existing shareholders from selling stock at a price different from book value. Fundamental growth, which combines internal and external growth, provides an explanation of the factors that cause book value per share to grow over time. Hence, a fundamental growth rate analysis is duplicative of expected book value per share growth.

Growth can also be expressed in multiple stages. This expression of growth consists of an initial "growth" stage where a firm enjoys rapidly expanding markets, high profit margins, and abnormally high growth in earnings per share. Thereafter, a firm enters a "transition" stage where fewer technological advances and increased product saturation begins to reduce the growth rate and profit margins come under pressure. During the "transition" phase, investment opportunities begin to mature, capital requirements decline, and a firm begins to pay out a larger percentage of earnings to shareholders. Finally, the mature or "steady-state" stage is reached when a firm's earnings growth, payout ratio, and return on equity stabilizes at levels where they remain for the life of a firm. The three stages of growth assume a step-down of high initial growth to lower sustainable growth. Even if these three stages of growth can be envisioned for a firm, the third "steady-state" growth stage, which is assumed to remain fixed in

perpetuity, represents an unrealistic expectation because the three stages of growth can be repeated. That is to say, the stages can be repeated where growth for a firm ramps-up and ramps-down in cycles over time.

Q. What investor-expected growth rate is appropriate in a DCF calculation?

A. Although some DCF proponents would advocate that mathematical precision should be followed when selecting a growth rate (i.e., precise input variables employed within the confines of fundamental growth described above), the fact is that investors, when establishing the market prices for a firm, do not behave in the same manner assumed by the constant growth rate model using the accounting values necessary to calculate fundamental growth. Rather, investors consider both company-specific variables and overall market sentiment (i.e., level of inflation rates, interest rates, economic conditions, etc.) when balancing their capital gains expectations with their dividend yield requirements. I follow an approach that is not rigidly formatted, because investors are not influenced by a single set of company-specific variables weighted in a formulaic manner. Therefore, in my opinion, all relevant growth rate indicators must be evaluated using a variety of techniques, when formulating a judgment of investor expected growth.

Q. Before presenting your analysis of the growth rates that apply specifically to the Gas Group, can you provide an overview of the macroeconomic factors that influence investor growth expectations for common stocks?

A. Yes. As a preliminary matter, it is useful to view macroeconomic forecasts that influence stock prices. Forecast growth of the Gross Domestic Product ("GDP") can represent the starting point for this analysis. The GDP has both "product side" and "income side" components. The product side of the GDP consists of: (i) personal consumption expenditures; (ii) gross private domestic investment; (iii) net exports of goods and services; and (iv) government consumption expenditures and gross investment. On the income side of the GDP, the components are: (i) compensation of employees; (ii) proprietors' income; (iii) rental income; (iv) corporate profits; (v) net interest; (vi) business transfer payments; (vii) indirect business taxes; (viii) consumption of fixed capital; (ix) net receipts/payment to the rest of the world; and (x) statistical discrepancy. The "product side," (i.e., demand components) could be used as a long-term representation of revenue growth for public utilities. However, it is well known that revenue growth does not necessarily equal earnings growth. There is no basis to assume that the same growth rate would apply to revenues and all components of the cost of service, especially after the troublesome issues of employees' costs, insurance costs, and high cost of gas are resolved in the long-term for public utilities. The earnings growth rates for utilities will be substantially affected by changes in operating expenses and capital costs. At present, there is a bearish sentiment for the industry that has arisen from uncertain regulatory policies, and significant cost pressures, especially in the area of employee costs (i.e., pension

and health care benefits), insurance costs, and the high cost of gas. The dilutive impact of recent sales of new common stock has also had a negative effect on the earnings prospects of gas utilities.

The long-term consensus forecast that is published semi-annually by the Blue Chip Economic Indicators ("Blue Chip") should be used as the source of macroeconomic growth. Blue Chip is a monthly publication that provides forecasts incorporating a wide variety of economic variables assembled from a panel of more than 50 noted economists from the banking, investment, industrial, and consulting sectors whose advice affects the investment activities of market participants. It is always preferable to use a consensus forecast taken from a large panel of contributors, rather than to rely upon one source that may not be representative of the types of information that have an impact on investor expectations. Indeed, Blue Chip is frequently quoted in "The Wall Street Journal," "The New York Times," "Fortune," "Forbes," and "Business Week." Twice annually, Blue Chip provides long-range consensus forecasts. Based upon the March 10, 2005 issue of Blue Chip, those forecasts are:

Blue Chip Economic Indicators

Year	Nominal GDP	Corporate Profits, Pretax
2007	5.3%	5.5%
2008	5.2%	5.2%
2009	5.2%	5.1%
2010	5.4%	6.4%
2011	5.4%	6.7%
Averages		
2007-11	5.3%	5.8%
2012-16	5.3%	6.3%

These forecasts show that growth in corporate profits will generally exceed growth in overall GDP. It is also indicated historically that the percentage change in corporate profits has been higher than the percentage change in GDP.[1] From these data, growth in corporate profits of about 6% would represent an overall benchmark for the long-term growth component of the DCF.

Q. What data have you considered in your growth rate analysis?

A. I have considered the growth in the financial variables shown on Schedules 6 and 7. The bar graph provided on Schedule 6 shows the historical growth rates covering 5-year and 10-year periods in earnings per share, dividends per share, book value per share, and cash flow per share for the Gas Group. The historical growth rates were taken from the Value Line publication that provides these data. As shown on Schedule 6, the historical earnings per share growth rates were 5.70% and 6.90% for the Gas Group.

[1] Obviously, growth in corporate profits are negatively impacted during recessionary periods, but on average corporate profits have grown historically over two percentage points faster than GDP since 1934.

Schedule 7 provides projected earnings per share growth rates taken from analysts' forecasts compiled by IBES/First Call, Zacks, Reuters/MarketGuide, and from the Value Line publication. The forecasts are generally based upon analysts' projections for a 5-year period. IBES/First Call, Zacks, and Reuters/MarketGuide represent reliable authorities of projected growth upon which investors rely. Thomson Financial has acquired the entity that published the IBES consensus forecasts, and Reuters/MarketGuide is the entity that provides the Multex data. The IBES/First Call, Zacks, and Reuters/MarketGuide forecasts are limited to earnings per share growth, while Value Line makes projections of other financial variables. The Value Line forecasts of dividends per share, book value per share, and cash flow per share have also been included on Schedule 7 for the Gas Group.

Q. What specific evidence have you considered in the DCF growth analysis?

A. As to the five-year forecast growth rates, Schedule 7 indicates that the projected earnings per share growth rates for the Gas Group are 4.91% by IBES/First Call, 5.20% by Zacks, 4.83% by Reuters/MarketGuide, and 6.50% by Value Line. The Value Line projections indicate that earnings per share for the Gas Group will grow prospectively at a more rapid rate (i.e., 6.50%) than the dividends per share (i.e., 3.40%), which indicates a declining dividend payout ratio for the future. As indicated earlier, and in Appendix E, with the constant price-earnings multiple assumption of the DCF model, growth for these companies will occur at the

higher earnings per share growth rate, thus producing the capital gains yield expected by investors.

Q. Is the five-year investment horizon associated with the analysts' forecasts consistent with the assumptions implicit in the DCF model?

A. Yes. Investors do not view their expected returns as the product of an endless stream of growing dividends (e.g., a century of cash flows). Instead, it is the growth in the share value (i.e., capital appreciation, or capital gains yield), as represented by the analysts' forecast, that is most relevant to investors' total return expectations. Hence, the future appreciation in the price of a stock can be viewed as a "liquidating dividend" (i.e., the final cash flow associated with the ultimate sale of stock) that can be discounted along with the annual dividend receipts during the investment-holding period to arrive at the investor expected return. The growth in the price per share will equal the growth in earnings per share absent any change in price-earnings (P-E) multiple -- a necessary assumption of the DCF. As such, my company-specific growth analysis, which focuses principally upon five-year forecasts of earnings per share growth, conforms to the type of analysis that influences the total return expectation of investors.

Q. What conclusion have you drawn from these data?

A. Although ideally, historical and projected earnings per share and dividends per share growth indicators could be used to provide an assessment of investor growth

expectations for a firm, the circumstances of the Gas Group mandate that the greater emphasis be placed upon projected earnings per share growth. The massive restructuring of the utility industry suggests that historical evidence alone does not represent a complete measure of growth for these companies. Rather, projections of future earnings growth provide the principal focus of investor expectations. In this regard, it is worthwhile to note that Professor Myron Gordon, the foremost proponent of the DCF model in rate cases, established that the best measure of growth in the DCF model is forecasts of earnings per share growth. Hence, to follow Professor Gordon's findings, projections of earnings per share growth, such as those published by IBES/First Call, Zacks, Reuters/MarketGuide, and Value Line, represents a reasonable assessment of investor expectations.

It is appropriate to consider all forecasts of earnings growth rates that are available to investors. In this regard, I have considered the forecasts from IBES/First Call, Zacks, Reuters/MarketGuide and Value Line. The IBES/First Call, Zacks, and Reuters/MarketGuide growth rates are consensus forecasts taken from a survey of analysts that make projections of growth for these companies. The IBES/First Call, Zacks, and Reuters/MarketGuide estimates are obtained from the Internet and are widely available to investors free-of-charge. IBES/First Call is probably quoted most frequently in the financial press when reporting on earnings forecasts, while Reuters/MarketGuide is a leading provider of financial

data on the Internet. The Value Line forecasts are also widely available to investors and can be obtained by subscription or free of charge at most public and collegiate libraries.

The forecasts of earnings per share growth as shown on Schedule 7 provide a range of growth rates of 4.83% to 6.50%. To those company-specific growth rates, consideration must be given to the 6% long-term growth in corporate profits. While the DCF growth rates cannot be established solely with a mathematical formulation, it is my opinion that an investor-expected growth rate of 5.75% is within the array of earnings per share growth rates shown by the analysts' forecasts and the forecast growth in overall corporate profits. The Value Line forecast of dividend per share growth is inadequate in this regard due to the forecast decline in the dividend payout that I previously described. As previously indicated, the restructuring and consolidation now taking place in the utility industry creates additional opportunities as the utility industry successfully adapts to the new business environment. These changes in growth fundamentals will undoubtedly develop beyond the next five years typically considered in the analysts' forecasts that will enhance the growth prospects for the future. As such, a 5.75% growth rate will accommodate all of these factors.

Q. Please explain why the sum of the dividend yield and growth rate does not provide a complete representation of the cost of equity.

A. As noted previously and as demonstrated in Appendix E, the divergence of stock

prices from book values creates a conflict when the results of a market-derived cost of equity are applied to the common equity ratio measured at book value, which is the measure used in calculating the weighted average cost of capital. This is the situation today where the market price of stock exceeds its book value for the companies in my proxy group. This divergence of price and book value creates a financial risk difference, whereby the capitalization of a utility measured at its market value contains relatively less debt and more equity than the capitalization measured at its book value.

Q. What are the implications of a DCF derived return that is related to market value when the results are applied to the book value of a utility's capitalization?

A. The capital structure ratios measured at the utility's book value show more financial leverage, and hence higher risk, than the capitalization measured at their market values. Please refer to Appendix E for the comparison. This means that a market-derived cost of equity, using models such as DCF and CAPM, reflects a level of financial risk that is different from that shown by the book value capitalization. Hence, it is necessary to adjust the market-determined cost of equity upward to reflect the higher financial risk related to the book value capitalization used for ratesetting purposes. Failure to make this modification would result in a mismatch of the lower financial risk related to market value used to measure the cost of equity and the higher financial risk of the book value

capital structure used in the ratesetting process. Because the ratesetting process utilizes the book value capitalization when considering an original cost rate base, it is necessary to adjust the market-determined cost of equity for the higher financial risk related to the book value of the capitalization.

Q. How is the DCF-determined cost of equity adjusted for the financial risk associated with the book value of the capitalization?

A. In pioneering work, Nobel laureates Modigliani and Miller developed several theories about the role of leverage in a firm's capital structure. As part of that work, Modigliani and Miller established that as the borrowing of a firm increases, the expected return on stockholders' equity also increases. This principle is incorporated into my leverage adjustment that recognizes that the expected return on equity increases to reflect the increased risk associated with the higher financial leverage shown by the book value capital structure, as compared to the market value capital structure that contains lower financial risk. Modigliani and Miller proposed several approaches to quantify the equity return associated with various degrees of debt leverage in a firm's capital structure. These formulas point toward an increase in the equity return associated with the higher financial risk of the book value capital structure. As detailed in Appendix E, the Modigliani and Miller theory shows that the cost of equity increases by 0.71% (10.12% - 9.41%) for the Gas Group when the book value of equity, rather than the market value of equity, is used in determining the weighted average cost of

capital for ratesetting purposes.

Q. Have you previously presented this modification to the Department in other rate case proceedings?

A. Yes. In both the Berkshire Gas (D.T.E. 01-56) and Boston Gas (D.T.E. 03-40) proceedings, I presented this adjustment. In both instances the Department declined to recognize this adjustment. In its Berkshire order, the Department stated:

> "The Department notes that the Company's proposed leverage adjustment relies on a comparison between book and market capitalization, and therefore has similar elements to the price-book ratio method of determining a utility's cost of equity. The Department has frequently rejected the price-book analysis because it fails to recognize variables such as a company's geographic location, load factors, and customer make-up, which can affect price-book ratios. Boston Edison Company, D.P.U. 906, at 100-101. Additionally, the price-book analysis has been found to rely excessively on investor perceptions of the relationship between market and book prices in their investment decisions. Eastern Edison Company, D.P.U. 837, at 49 (1982). These weaknesses of the price-book ratio analysis are also present in Berkshire's leverage adjustment."

Unfortunately, in both the Berkshire and Boston Gas cases, I may have insufficiently explained the underpinnings of the leverage adjustment. The adjustment addresses strictly the issue of financial risk, and is not dependent upon a price to book analysis as suggested in the Department's order. Indeed, there is no input variable for any price to book ratio in the formulas that I have employed. I do concur with the Department's observation that there are a multiplicity of

factors that affect investor decisions concerning the valuation of a utility's common stock. However, there is no attempt on my part to ensure a price-book ratio of 1:1. My leverage adjustment contains no target price to book ratio. Rather my adjustment provides recognition of the financial risk difference between the market capitalization and the book value capitalization. Furthermore, there is no need to address the issues of a company's geographic location, load factors, and customer make-up. These latter factors affect the business risk of a company, and they have no bearing on the financial risk adjustment that I propose. Financial risk is a separate issue from business risk (see Appendix C).

Q. Please provide the DCF return based upon your preceding discussion of dividend yield, growth, and leverage.

A. As explained previously, I have utilized a six-month average dividend yield ("D_1/P_0") adjusted in a forward-looking manner for my DCF calculation. This dividend yield is used in conjunction with the growth rate ("*g"*) previously developed. The DCF also includes the leverage modification ("*lev."*) required when the book value equity ratio is used in determining the weighted average cost of capital in the ratesetting process rather than the market value equity ratio related to the price of stock.

The resulting DCF cost rate is:

	D_1/P_0	+	g	+	$lev.$	=	k
Gas Group	3.66%	+	5.75%	+	0.71%	=	10.12%

The DCF result shown above represents the simplified (i.e., Gordon) form of the model that contains a constant growth assumption. I should reiterate, however, that under this form of the DCF model, the indicated cost rate provides an explanation of the rate of return on common stock market prices without regard to the prospect of a change in the price-earnings multiple. An assumption that there will be no change in the price-earnings multiple is not supported by the realities of the equity market because price-earnings multiples do not remain constant.

RISK PREMIUM ANALYSIS

Q. Please describe your use of the Risk Premium approach to determine the cost of equity.

A. The details of my use of the Risk Premium approach and the evidence in support of my conclusions are set forth in Appendix G. I will summarize them here. With this method, the cost of equity capital is determined by corporate bond yields plus a premium to account for the fact that common equity is exposed to greater investment risk than debt capital. As with other models of the cost of equity, the Risk Premium approach has its limitations including an accurate assessment of the future cost of corporate debt and the measurement of the risk-adjusted common equity premium.

Q. What long-term public utility debt cost rate did you use in your risk

premium analysis?

A. In my opinion, a 6.75% yield represents a reasonable estimate of the prospective yield on long-term A-rated public utility bonds. As I will subsequently show, the Moody's index and the Blue Chip forecasts support this figure.

The historical yields for long-term public utility debt are shown graphically on page 1 of Schedule 8. For the twelve months ended June 2005, the average monthly yield on Moody's A-rated index of public utility bonds was 5.83%. For the six and three-month periods ending June 2005, the yields were 5.63% and 5.52%, respectively.

Q. What are the implications of emphasizing recent data taken from a period of relatively low interest rates?

A. It appears obvious that if interest rates rise from their current low levels, the overall cost of capital and cost of equity determined from recent data will understate future capital costs. In the context of a multi-year PBR plan, recognizing prospective average interest rates is critically important. Although it is always possible that interest rates could move lower, this possibility is out-weighed by the prospect of higher future interest rates. That is to say, there is more potential for higher rather than lower interest rates when the beginning point in the process contains low interest rates.

The low interest rates in 2003-'04 were, in part, the product of the Federal Open Market Committee ("FOMC") policy, which is now in transition. Indeed, on

June 30, 2004, August 10, 2004, September 21, 2004, November 10, 2004, December 14, 2004, February 2, 2005, March 22, 2005, May 3, 2005, June 30, 2005, and August 9, 2005 the FOMC increased the Fed Funds rate in ten 25 basis point increments. These policy actions are widely interpreted as part of the process of moving toward a more neutral range for the Fed Funds rate. With a Fed Funds rate of 3.50%, there are likely to be more increases in the future.

Q. What forecasts of interest rates have you considered in your analysis?

A. I have determined the prospective yield on A-rated public utility debt by using the Blue Chip Financial Forecasts ("Blue Chip") along with the spread in the yields that I describe above and in Appendix F. Blue Chip is a reliable authority and contains consensus forecasts of a variety of interest rates compiled from a panel of banking, brokerage, and investment advisory services. In early 1999, Blue Chip stopped publishing forecasts of yields on A-rated public utility bonds because the Federal Reserve deleted these yields from its Statistical Release H.15. To independently project a forecast of the yields on A-rated public utility bonds, I have combined the forecast yields on long-term Treasury bonds published on July 1, 2005 and the yield spread of 1.00% that I describe in Appendix F. For comparative purposes, I have also shown the Blue Chip forecast of yields of Aaa-rated and Baa-rated corporate bonds. These forecasts are:

		Blue Chip Financial Forecasts				
		Corporate		20-Year	A-rated Public Utility	
Year	Quarter	Aaa-rated	Baa-rated	Treasury	Spread	Yield
2005	Third	5.4%	6.2%	4.7%	1.0%	5.7%
2005	Fourth	5.7%	6.5%	4.9%	1.0%	5.9%
2006	First	5.9%	6.7%	5.1%	1.0%	6.1%
2006	Second	6.0%	6.8%	5.2%	1.0%	6.2%
2006	Third	6.1%	6.9%	5.3%	1.0%	6.3%
2006	Fourth	6.1%	7.0%	5.3%	1.0%	6.3%

Q. Are there additional forecasts of interest rates that extend beyond those shown above?

A. Yes. Twice yearly, Blue Chip provides long-term forecast of interest rates. In its June 1, 2004 publication, the Blue Chip published forecasts of interest rates are reported to be:

	Blue Chip Financial Forecasts				
	Corporate		20-Year	A-rated Public Utility	
Year	Aaa-rated	Baa-rated	Treasury	Spread	Yield
2007	6.6%	7.3%	5.9%	1.0%	6.9%
2008	6.5%	7.3%	5.8%	1.0%	6.8%
2009	6.5%	7.3%	5.7%	1.0%	6.7%
2010	6.4%	7.2%	5.6%	1.0%	6.6%
2011	6.5%	7.2%	5.6%	1.0%	6.6%
Averages					
2007-11	6.5%	7.2%	5.7%	1.0%	6.7%
2012-16	6.5%	7.3%	5.8%	1.0%	6.8%

These forecasts show that through 2011 interest rates will likely be well above current levels. Given these forecasts of long-term interest rates, a 6.75% yield on A-rated public utility bonds represents a reasonable expectation, especially with the

widespread forecasts of higher interest rates covering the years 2007 through 2011.

Q. What equity risk premium have you determined for public utilities?

A. Appendix G provides a discussion of the financial returns that I relied upon to develop the appropriate equity risk premium for the S&P Public Utilities. I have calculated the equity risk premium by comparing the market returns on utility stocks and the market returns on utility bonds. I chose the S&P Public Utility index for the purpose of measuring the market returns for utility stocks because it is intended to represent firms engaged in regulated activities and today is comprised of electric companies and gas companies. The S&P Public Utility index is more closely aligned with these groups than some broader market indexes, such as the S&P 500 Composite index. The S&P Public Utility index is a subset of the overall S&P 500 Composite index. Use of the S&P Public Utility index reduces the role of judgment in establishing the risk premium for public utilities. With the equity risk premiums developed for the S&P Public Utilities as a base, I derived the equity risk premium for the Gas Group.

Q. What equity risk premium for the S&P public utilities have you determined for this case?

A. To develop an appropriate risk premium, I analyzed the results for the S&P Public Utilities by averaging (i) the midpoint of the range shown by the geometric mean and median and (ii) the arithmetic mean. This procedure has been employed to provide a comprehensive way of measuring the central tendency of the historical

returns. As shown by the values set forth on page 2 of Schedule 9 the indicated risk premiums for the various time periods analyzed are 4.99% (1928-2004), 5.75% (1952-2004), 4.85% (1974-2004), and 4.91% (1979-2004). The selection of the shorter periods taken from the entire historical series is designed to provide a risk premium that conforms more nearly to present investment fundamentals and removes some of the more distant data from the analysis.

Q. Do you have further support for the selection of the time periods used in your equity risk premium determination?

A. Yes. First, the terminal year of my analysis presented in Schedule 9 represents the returns realized through 2004. Second, the selection of the initial year of each period was based upon the events that I described in Appendix G. These events were fixed in history and cannot be manipulated as later financial data becomes available. That is to say, using the Treasury-Federal Reserve Accord as a defining event, the year 1952 is fixed as the beginning point for the measurement period regardless of the financial results that subsequently occurred. Likewise, 1974 represented a benchmark year because it followed the 1973 Arab Oil embargo. Also, the year 1979 was chosen because it began the deregulation of the financial markets. As such, additional data are merely added to the earlier results when they become available, clearly showing that the periods chosen were not driven by the desired results of the study.

Q. What conclusions have you drawn from these data?

A. Using the summary values provided on page 2 of Schedule 9, the 1974-2004 period provides the lowest indicated risk premiums, while the 1952-2004 period provides the highest risk premium for the S&P Public Utilities. Within these bounds, a common equity risk premium of 4.95% (4.99% + 4.91% = 9.90% ÷ 2) is shown from data covering the periods 1928-2004 and 1979-2004. Therefore, 4.95% represents a reasonable risk premium for the S&P Public Utilities in this case.

As noted earlier in my fundamental risk analysis, differences in risk characteristics must be taken into account when applying the results for the S&P Public Utilities to the Gas Group. I recognized these differences in the development of the equity risk premium in this case. I previously enumerated various differences in fundamentals among the Gas Group and the S&P Public Utilities, including size, market ratios, common equity ratio, return on book equity, operating ratios, coverage, quality of earnings, internally generated funds, and betas. In my opinion, these differences indicate that 4.75% represents a reasonable common equity risk premium in this case. This represents approximately 96% (4.75% ÷ 4.95% = 0.96) of the risk premium of the S&P Public Utilities and is reflective of the risk of the Gas Group compared to the S&P Public Utilities.

Q. What common equity cost rate would be appropriate using this equity risk premium and the yield on long-term public utility debt?

A. The cost of equity (i.e., "*k"*) is represented by the sum of the prospective yield for long-term public utility debt (i.e., "*i"*) and the equity risk premium (i.e., "*RP"*). The Risk Premium approach provides a cost of equity of:

	i	+	*RP*	=	*k*
Gas Group	6.75%	+	4.75%	=	11.50%

CAPITAL ASSET PRICING MODEL

Q. How have you used the Capital Asset Pricing Model to measure the cost of equity in this case?

A. I have used the CAPM in addition to my other methods. As with other models of the cost of equity, the CAPM contains a variety of assumptions that create limitations in the model that I discuss in Appendix H. Therefore, this method should be used with other methods to measure the cost of equity, as each will complement the other and will provide a result that will alleviate the unavoidable shortcomings found in each method.

Q. What are the features of the CAPM as you have used it?

A. The CAPM uses the yield on a risk-free interest bearing obligation plus a rate of return premium that is proportional to the systematic risk of an investment. The details of my use of the CAPM and evidence in support of my conclusions are set forth in Appendix H. To compute the cost of equity with the CAPM, three components are necessary: a risk-free rate of return ("*Rf"*), the beta measure of systematic risk ("*β"*), and the market risk premium ("*Rm – Rf")* derived from the

total return on the market of equities reduced by the risk-free rate of return. The CAPM specifically accounts for differences in systematic risk (i.e., market risk as measured by the beta) between an individual firm or portfolio of firms and the entire market of equities. As such, to calculate the CAPM it is necessary to employ firms with traded stocks. In this regard, I performed a CAPM calculation for the Gas Group.

Q. What betas have you considered in the CAPM?

A. For my CAPM analysis, I initially considered the Value Line betas. As shown on page 1 of Schedule 10, the average beta is .74 for the Gas Group.

Q. What betas have you used in the CAPM determined cost of equity?

A. The betas must be reflective of the financial risk associated with the ratesetting capital structure that is measured at book value. Therefore, Value Line betas cannot be used directly in the CAPM unless those betas are applied to a capital structure measured with market values. To develop a CAPM cost rate applicable to a book value capital structure, the Value Line betas have been unleveraged and releveraged for the common equity ratios using book values. This adjustment has been made with the formula:

$$\beta l = \beta u \, [1 + (1 - t) \, D/E + P/E]$$

where βl = the leveraged beta, βu = the unleveraged beta, t = income tax rate, D = debt ratio, P = preferred stock ratio, and E = common equity ratio. The betas published by Value Line have been calculated with the market price of stock and

therefore are related to the market value capitalization. By using the formula shown above and the capital structure ratios measured at their market values, the beta would become .57 for the Gas Group if they employed no leverage and were 100% equity financed. With the unleveraged beta as a base, I calculated the leveraged beta of .88 for the Gas Group associated with book value capital structure.

Q. What risk-free rate have you used in the CAPM?

A. For reasons explained in Appendix F, I have employed the yields on 20-year Treasury bonds using both historical and forecast data to match the longer-term horizon associated with the ratesetting process. As shown on pages 2 and 3 of Schedule 10, I provided the historical yields on 20-year Treasury bonds. For the twelve months ended June 2005, the average yield was 4.81%, as shown on page 3 of that schedule. For the six- and three-months ended June 2005, the yields on 20-year Treasury bonds were 4.66% and 4.55%, respectively. As shown on page 4 of Schedule 10, forecasts published by Blue Chip on July 1, 2005 indicate that the yields on long-term Treasury bonds are expected increase to 5.3% during the next six quarters. The longer term forecasts described previously show that the yields on Treasury bonds will average 5.7% from 2007 through 2011. I have used a 5.75% risk-free rate of return for CAPM purposes.

Q. What market premium have you used in the CAPM?

A. As developed in Appendix H, the market premium is developed by averaging

historical market performance (i.e., 6.6%) and the forecasts (i.e., 6.64%). The resulting market premium is 6.62% (6.6% + 6.64% = 13.24% ÷ 2), which represents the average market premium using the historical and forecast data.

Q. Are there adjustments to the CAPM that are necessary to fully reflect the rate of return on common equity?

A. Yes. The technical literature supports an adjustment relating to the size of NSTAR Gas or portfolio for which the calculation is performed. There would be an understatement of the cost of equity using the CAPM unless the size of a firm is considered. That is to say, as the size of a firm decreases, its risk, and hence its required return increases. Moreover, in his discussion of the cost of capital, Professor Brigham has indicated that smaller firms have higher capital costs then otherwise similar larger firms (see Fundamentals of Financial Management, fifth edition, page 623). Also, the Fama/French study (see "The Cross-Section of Expected Stock Returns"; The Journal of Finance, June 1992) established that size of a firm helps explain stock returns. In an October 15, 1995 article in Public Utility Fortnightly, entitled "Equity and the Small-Stock Effect," it was demonstrated that the CAPM could understate the cost of equity significantly according to a company's size. Indeed, it was demonstrated in the SBBI Yearbook that stocks in lower deciles (i.e., smaller stocks) had returns in excess of those shown by the simple CAPM. In this regard, Gas Group has an average market capitalization of its equity of $1,513 million, which would place it in the sixth decile consisting of companies with market

capitalization between $746 million and $1,608 million according to the size of the companies traded on the NYSE, AMEX, and NASDAQ. Although the Gas Group would be classified as a low-cap portfolio with its $1,513 million average market capitalization, I have taken a conservative approach to the size adjustment by employing a mid-cap adjustment. According to the SBBI Yearbook, the mid-cap size premium is 0.95%. Absent the size adjustment, the CAPM would understate the required return for the Gas Group.

Q. What CAPM result have you determined using the CAPM?

A. Using the 5.75% risk-free rate of return, the leverage adjusted betas of .88 for the Gas Group, the 6.62% market premium, and the size premium noted above, the following result is indicated.

	$Rf + \beta\ (Rm\text{-}Rf) = k + size = k$
Gas Group	5.75% + .88 (6.62%) = 11.58% + 0.95% = 12.53%

COMPARABLE EARNINGS APPROACH

Q. How have you applied the Comparable Earnings approach in this case?

A. The technical aspects of my Comparable Earnings approach are set forth in Appendix I. In order to identify the appropriate return on equity for a public utility, it is necessary to analyze returns experienced by other firms within the context of the Comparable Earnings standard. The firms selected for the Comparable Earnings approach should be companies whose prices are not subject to cost-based price ceilings (i.e., non-regulated firms) so that circularity is

avoided. To avoid circularity, it is essential that returns achieved under regulation not provide the basis for a regulated return. Because regulated firms must compete with non-regulated firms in the capital markets, it is appropriate, if not necessary, to view the returns experienced by firms that operate in competitive markets. One must keep in mind that the rates of return for non-regulated firms represent results on book value actually achieved, or expected to be achieved, because the starting point of the calculation is the actual experience of companies that are not subject to rate regulation. The United States Supreme Court has held that:

> A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties…. The return should be reasonably sufficient to assure confidence in the financial soundness of the utility and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties. Bluefield Water Works vs. Public Service Commission, 262 U.S. 668 (1923).

Therefore, it is important to identify the returns earned by firms that compete for capital with a public utility. This can be accomplished by analyzing the returns of non-regulated firms that are subject to the competitive forces of the marketplace.

There are two avenues available to implement the Comparable Earnings

approach. One method would involve the selection of another industry (or industries) with comparable risks to the public utility in question, and the results for all companies within that industry would serve as a benchmark. The second approach requires the selection of parameters that represent similar risk traits for the public utility and the comparable risk companies. Using this approach, the business lines of the comparable companies become unimportant. The latter approach is preferable with the further qualification that the comparable risk companies exclude regulated firms. As such, this approach to Comparable Earnings avoids the circular reasoning implicit in the use of the achieved earnings/book ratios of other regulated firms. Rather, it provides an indication of an earnings rate derived from non-regulated companies that are subject to competition in the marketplace and not rate regulation. Because regulation is a substitute for competitively-determined prices, the returns realized by non-regulated firms with comparable risks to a public utility provide useful insight into a fair rate of return. This is because returns realized by non-regulated firms have become increasingly relevant with the trend toward increased risk throughout the public utility business. Moreover, the rate of return for a regulated public utility must be competitive with returns available on investments in other enterprises having corresponding risks, especially in a more global economy.

To identify the comparable risk companies, the Value Line Investment Survey for Windows was used to screen for firms of comparable risks. The Value

Line Investment Survey for Windows includes data on approximately 1800 firms. Excluded from the selection process were companies incorporated in foreign countries and master limited partnerships ("MLPs").

Q. How have you implemented the Comparable Earnings approach?

A. In order to implement the Comparable Earnings approach, non-regulated companies were selected from the Value Line Investment Survey for Windows that have six categories (see Appendix I for definitions) of comparability designed to reflect the risk of the Gas Group. These screening criteria were based upon the range as defined by the rankings of the companies in the Gas Group. The items considered were: Timeliness Rank, Safety Rank, Financial Strength, Price Stability, Value Line betas, and Technical Rank. The identities of companies comprising the Comparable Earnings group and their associated rankings within the ranges are identified on page 1 of Schedule 11.

Value Line data was relied upon because it provides a comprehensive basis for evaluating the risks of the comparable firms. As to the returns calculated by Value Line for these companies, there is some downward bias in the figures shown on page 2 of Schedule 11 because Value Line computes the returns on year-end rather than average book value. If average book values had been employed, the rates of return would have been slightly higher. Nevertheless, these are the returns considered by investors when taking positions in these stocks. Finally, because many of the comparability factors, as well as the

published returns, are used by investors for selecting stocks, and to the extent that investors rely on the Value Line service to gauge their returns, it is, therefore, an appropriate database for measuring comparable return opportunities.

Q. What data have you used in your Comparable Earnings analysis?

A. I have used both historical realized returns and forecast returns for non-utility companies. As noted previously, I have not used returns for utility companies so as to avoid the circularity that arises from using regulatory influenced returns to determine a regulated return. It is appropriate to consider a relatively long measurement period in the Comparable Earnings approach in order to cover conditions over an entire business cycle. A ten-year period (5 historical years and 5 projected years) is sufficient to cover an average business cycle. Unlike the DCF and CAPM, the results of the Comparable Earnings method can be applied directly to an original cost rate base because the nature of the analysis relates to book value. Hence, the Comparable Earnings approach does not contain the potential misspecification that results from applying the result of market models to an original cost rate base when prices and book values diverge significantly. The historical rate of return on book common equity was 13.8% using the median value as shown on page 2 of Schedule 11. The forecast rates of return as published by Value Line are shown by the 13.5% median values also provided on page 2 of Schedule 11.

Q. What rate of return on common equity have you determined in this case

using the Comparable Earnings approach?

A. The average of the historical and forecast median rates of return is 13.65% (13.8% + 13.5% = 27.3% ÷ 2) and represents the Comparable Earnings result for this case. The results of the Comparable Earnings method are not sensitive to stock market performance, but rather these results are determined from financial performance in competitive markets that are determined in large measure by the business cycle.

CREDIT QUALITY

Q. What are some of the important factors that influence credit quality?

A. NSTAR Gas must have the financial strength that will, at a minimum, permit it to maintain a financial profile that is commensurate with the requirements to obtain a solid investment grade bond rating. Strong credit quality is necessary to provide a utility with the highest degree of financial flexibility in order to attract capital on reasonable terms during all economic conditions. Customers also benefit from strong credit quality because the utility will be able to obtain lower financing costs that are passed on to customers in the form of a lower embedded cost of debt. For this reason, rates should be established that would allow the maintenance of a financial profile that would support a strong A-bond rating.

Q. What credit quality matrix is now being emphasized by the credit rating agencies?

A. On June 2, 2004, S&P revised its financial guidelines for assessing the credit quality

of the utility industry. Aside from the qualitative factors that influence a credit quality rating, there are now three financial guidelines with published benchmarks. S&P has ceased publishing benchmark criteria for pre-tax interest coverage. Interest coverage provided by funds from operations ("FFO") is presently emphasized by S&P in its quantitative analysis. As such, FFO interest coverage is now the benchmark used to assess the credit quality profile for public utilities. The FFO/interest coverage associated with an A credit quality profile should be the focus.

CONCLUSION ON COST OF EQUITY

Q. What is your conclusion concerning NSTAR Gas' cost of common equity?

A. Based upon the application of a variety of methods and models described previously, it is my opinion that the reasonable cost of common equity is 11.50% for NSTAR Gas. It is essential that the Department employ a variety of techniques to measure NSTAR Gas' cost of equity because of the limitations/infirmities that are inherent in each method.

Q. Does this conclude your direct testimony?

A. Yes, it does.